U.S.NRC
United States Nuclear Regulatory Commission
Protecting People and the Environment

Staff Presentation on New and Advanced Reactor Licensing Processes

January 20, 2022

2:00pm – 5:30pm

Agenda

Opening Remarks

Key Messages

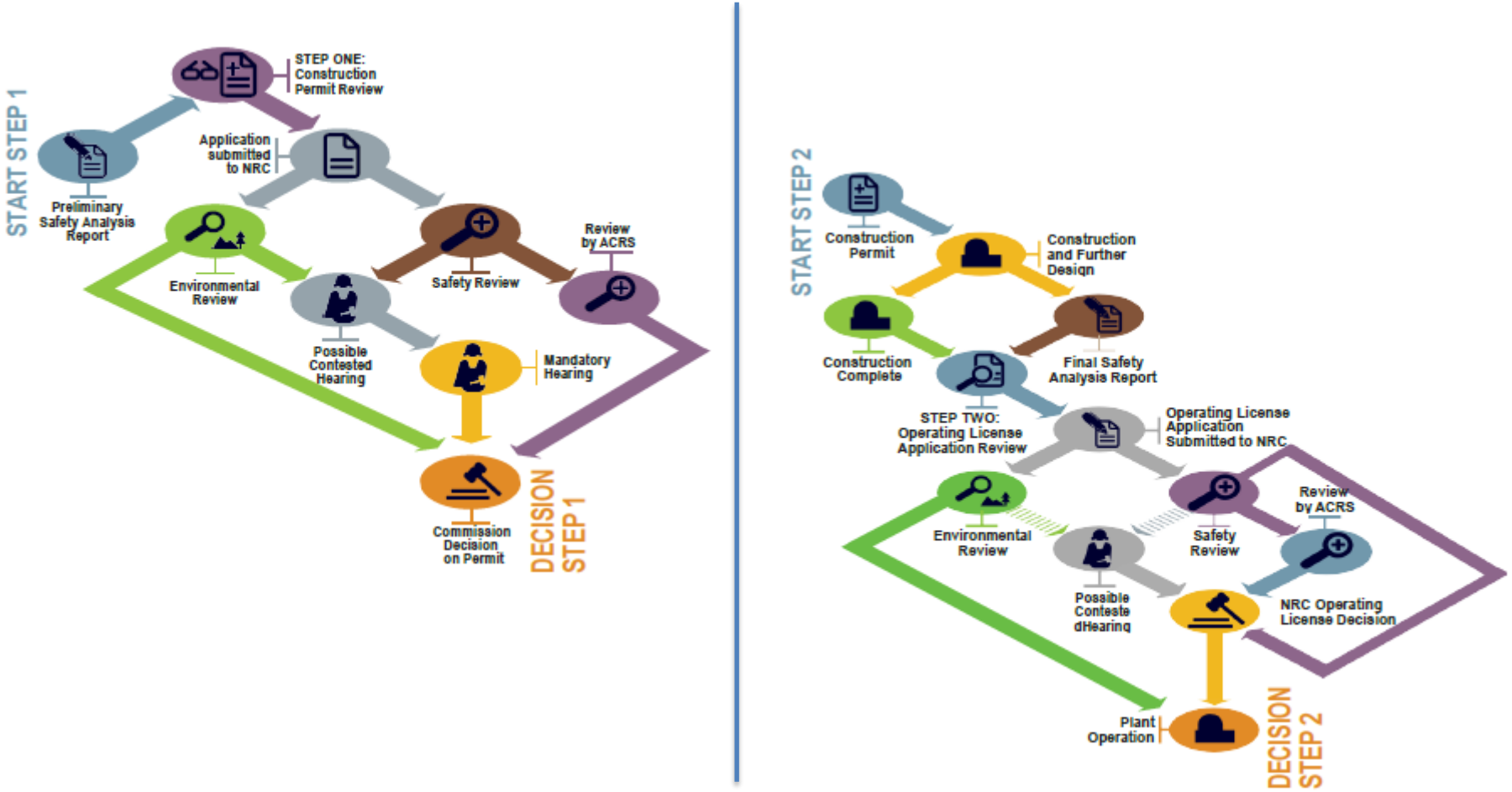
- Licensing of new and advanced reactors available under 10 CFR Parts 50, 52, and 53 (in development)
- Pre-application activities have been effective in preparing for application reviews
  - Pre-application engagement
  - Review and Assessment of White Papers
  - Review and Evaluation of Topical Reports
- Based on lessons learned, the NRC is enhancing its review processes with formal guidance and updates to its internal procedures

Purpose

To discuss the activities supporting the new and advanced reactor licensing processes under 10 CFR Part 50 and 52

- How the responses to white papers and the evaluations of topical reports fit into a future licensing action.
- How the staff is streamlining its review process.

Overview of the 2-Step Licensing Process under 10 CFR Part 50 (Construction Permit and Operating License)



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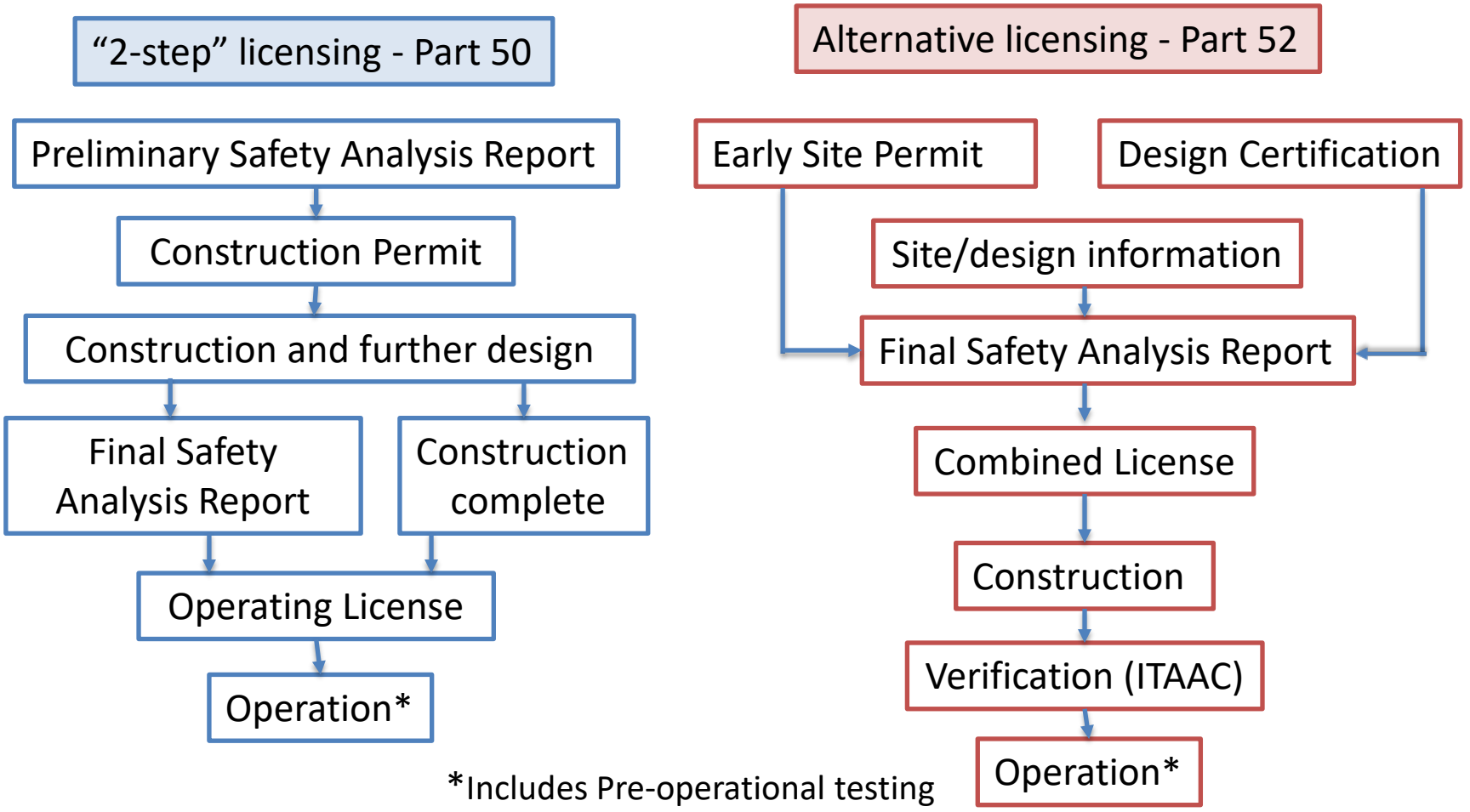
Overview of the 1-Step Licensing Process under 10 CFR Part 52 (Combined Construction and Operating License)

10 CFR Part 50 vs. 10 Part 52 Licensing Processes



*Includes Pre-operational testing

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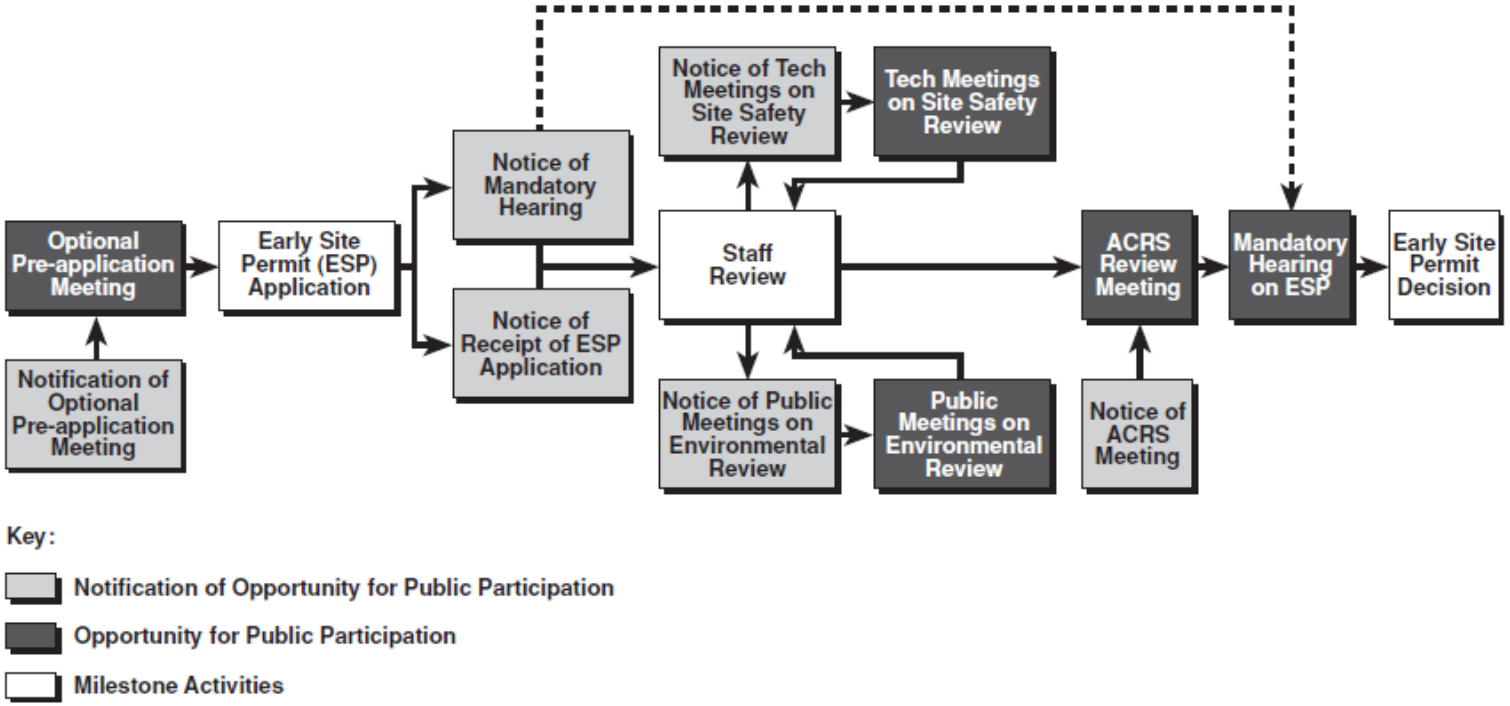
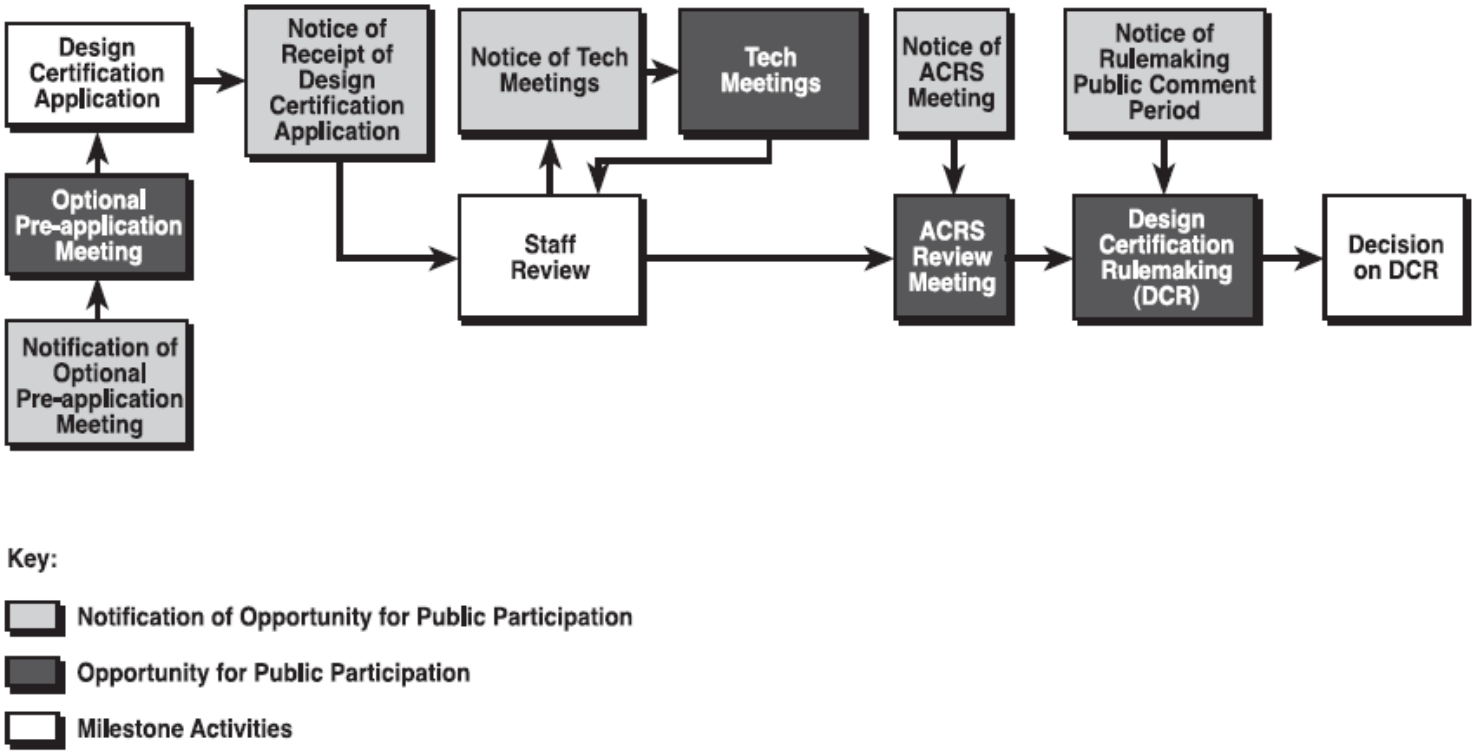
Additional Licensing Processes Under 10 CFR Part 52

- Early Site Permits
- Standard Design Certification
- Manufacturing License
- Duplicate Plant License
- Standard Design Approval
- Site Suitability Reviews

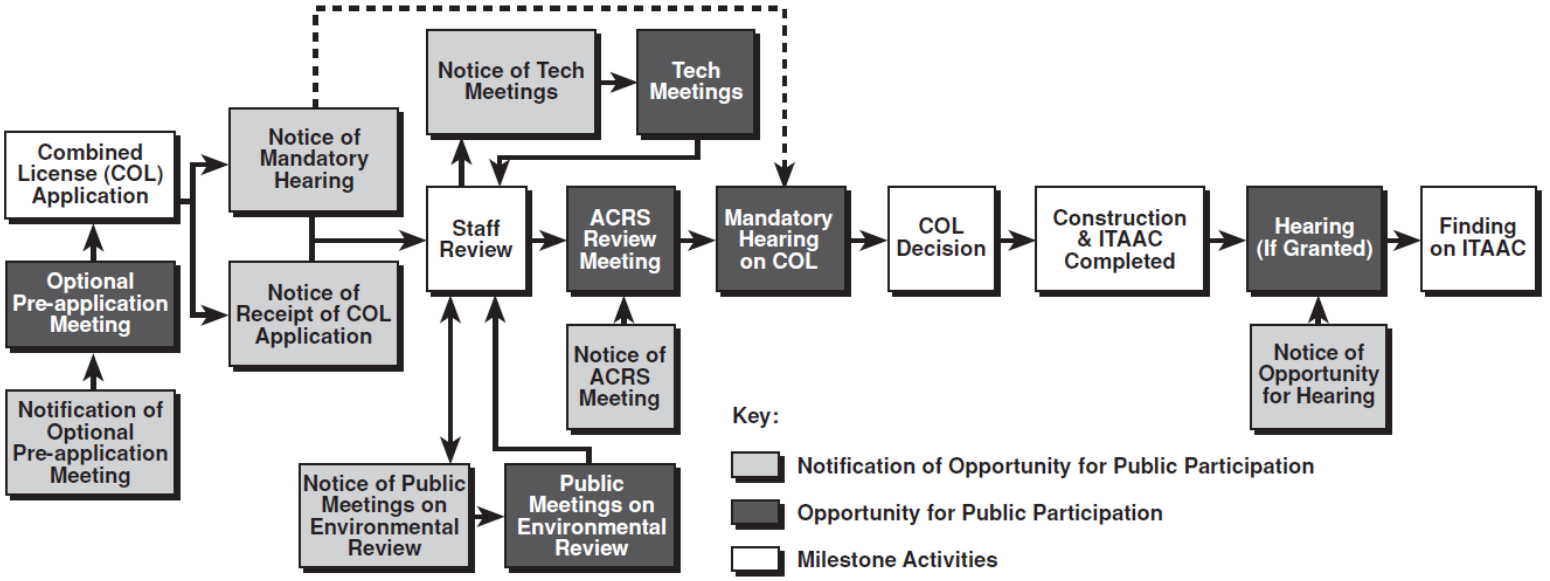
Opportunities for Public Involvement in the 10 CFR Part 52 Early Site Permit Process



Opportunities for Public Involvement in the 10 CFR Part 52 Design Certification Process



Opportunities for Public Involvement in the 10 CFR Part 52 COL Process



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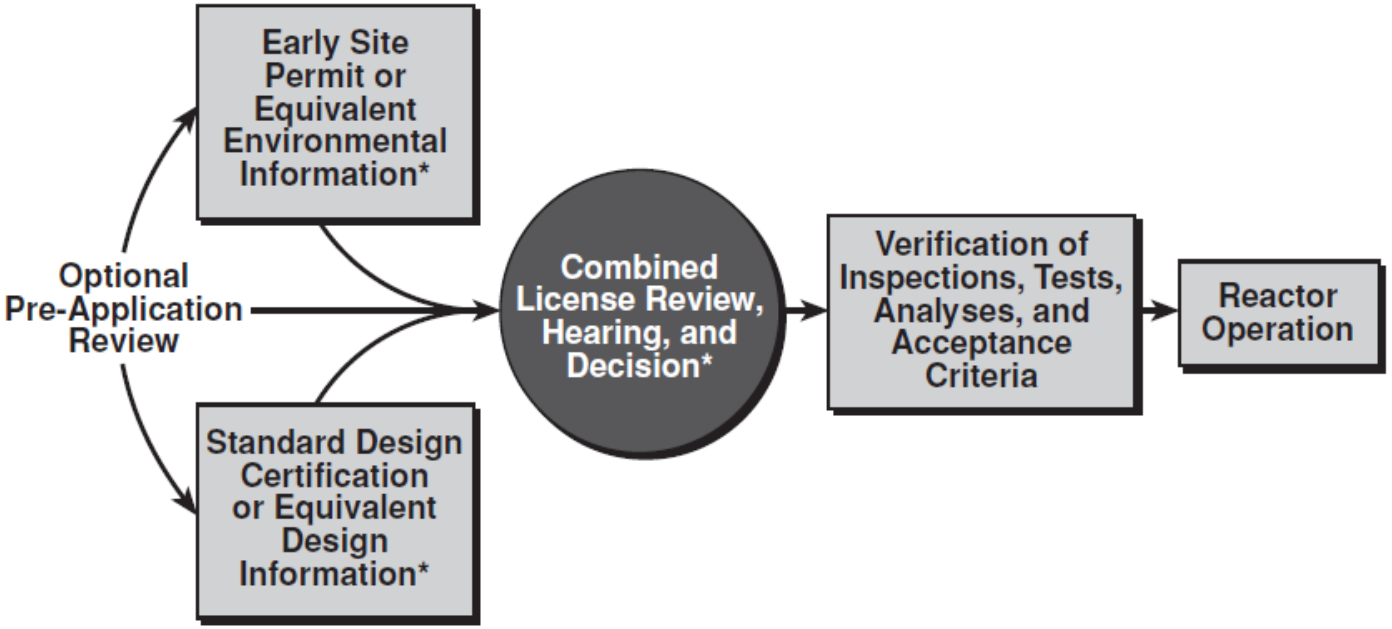
Relationship Among Combined Licenses, Early Site Permits, and Standard Design Certifications



*A combined license application can reference an early site permit, a standard design certification, both, or neither. If an application does not reference an early site permit and/or a standard design certification, the applicant must provide an equivalent level of information in the combined license application.

Pre-Application Activities Supporting the Licensing Process

- Pre-application engagement (ML21145A106)
- NRC response to applicant's general correspondence
- NRC review of and feedback on applicant's regulatory engagement plan (ML18122A293)
- NRC assessment and response to applicant's white papers
- NRC evaluation of applicant's technical and topical reports
- Pre-application audits to support a high-quality application.

Pre-application Engagement (ML21145A106)

Advantages for Applicants	Advantages for NRC
Enhanced regulatory predictability, reducing project risk	Greater review efficiency because NRC staff becomes familiar with the design and develops topical report safety evaluations that can be referenced by the application safety evaluation report
Greater review efficiency because NRC staff becomes familiar with design. Efficiency translates to lower costs and shorter review schedules	Early public engagement on the attributes of a design, increasing transparency and enhancing public awareness
Early interactions between the NRC, the applicant, and other agencies that have a role in the environmental review could shorten the licensing review schedule.	NRC staff becomes familiar with new approaches an applicant is considering and unique environmental aspects of a site
Early engagement with the Advisory Committee on Reactor Safeguards (ACRS) through the review of safety evaluations on topical reports. This early ACRS involvement will improve regulatory reliability and shorten application review times.	Early engagement with the ACRS through the review of safety evaluations on topical reports. This early ACRS involvement will reduce the number of issues addressed during the application review and lessen the effort of application review.

Best Practices

- Conducting face-to-face page-turn activity with applicable technical staff
- Issuing regulatory gap analysis letters to identify unique areas of designs
- Reviewing consensus codes and standards, and incorporating it into staff guidance
- Reviewing other supporting documents or programs
- Conducting rulemaking and developing or updating guidance

Activities Supporting An Efficient Review

- Submission of a high-quality application
- Use of a risk-informed approach to focus staff resources on review areas commensurate with their safety significance
- Complete and timely submission of responses to requests for additional information
- Use of a tracking process for the highly challenging issues (HCIs)
- Early coordination with technical, management, and legal staff on HCIs
- Use of audits in areas involving first-of-a-kind design features and to support resolution of RAIs and HCIs
- Use of an electronic reading room to share information where the design is evolving
- Use of a core review team and charter to facilitate efficient reviews.

Review and Assessment of White Papers

An applicant may submit a white paper to the NRC seeking *informal* feedback and can allow the preliminary design review to be focused on the technical issues related to the safety of the design.

The NRC's response does not constitute an agency position or provide any finality or backfit protection.

The objective of a white paper is to increase applicant's understanding, to explore problems, or address how to make a design specific decision.

There are no specific requirements or guidance for the development, or the NRC staff review of white papers.

Benefits arising from applicant's white papers

- Preliminary regulatory feedback in response to applicant requests. Examples include:
  - licensing approaches
  - proposed format and outline of an application
  - applicability of regulations to a design
  - applicable consensus codes and standards
  - qualification strategies, methodologies, testing plans
  - proposed principal design criteria, postulated initiating events, SSC classification
  - staffing approaches, EPZ sizing, transportation and packaging
- NRC staff gains knowledge of a design and possible license approaches by an applicant

Relationship between white papers and a future license application

- Discussed in the applicant's regulatory engagement plan
- Feedback used by applicant to develop its application
- Dependent on topic of white paper
- Supports the applicant's abilities to assess alternatives and to further progress its design
- Supports the staff's review prioritization that could affect expected regulatory outcomes
- *Less specificity and less regulatory certainty than topical reports*

Review and evaluation of topical reports

An applicant may submit a topical report for review and approval that contains technical information about:

- A reactor
- Structures, systems and components
- A safety topic
- A methodology

Non-LWR applicants commonly submit topical reports on the applicability of regulations and principal design criteria.

A topical report may reference technical reports that provide results of research, testing, or analyses to help verify or validate computer models, or other supporting information for a license application.

Guidance on the NRC staff's review of topical reports is found in NRR Office Instruction LIC-500, "Topical Report Process"

Benefits arising from topical report reviews

- Early review and feedback of technical information by ACRS
- Improves efficiency of licensing process by allowing NRC staff review of methodologies, designs, and operational requirements subsequently referenced in a license application
- Facilitates regulatory certainty on key methodologies, designs, and operational requirements subsequently referenced in a license application
- Early identification of potential policy issues
- May provide a technical basis for a licensing action
- Used extensively for obtaining NRC staff findings on proposed design features and analysis methods.

Relationship between topical reports and a future license application

- Discussed in the applicant's regulatory engagement plan
- Staff findings expected to be referenced in a license application
- Conditional staff findings expected to be addressed and reviewed in a license application
- *More specificity and more regulatory certainty than white papers*

Staff Review Process Enhancements

- Developing and Completed Review Guidance
  - Light-water Power-Reactor Construction Permit Interim Staff Guidance (ML21165A157)
  - NuScale lessons learned Report (to be issued early 2022)
  - Contents of Applications TICAP/ARCAP
  - Updated NRC Staff Draft White Paper Analysis of Applicability of NRC Regulations for Non-Light Water Reactors (ML21175A287)
  - Interim Staff Guidance, COL-ISG-029. Environmental Considerations Associated with Micro-reactors (ML20252A076)
  - RG 1.232 Advanced Non-LWR Reactor Design Criteria (ML17325A611)
  - RG 1.233 Licensing Modernization Project/NEI 18-04 (ML20091L698)

Staff Review Process Enhancements (continued)

- Continuing to streamline the safety evaluation reports
  - Removing history of responses to requests for additional information
  - Improving quality and readability of the SER
  - Establishing writing standards for sections in the SER using plain language and focusing on the information necessary to communicate the bases for NRC staff decisions
- Implementing a Flexible Review Process
  - Supports the NEIMA generic milestone schedules
  - Advisory Committee on Reactor Safeguards briefings planned early to support a focus on specific technical areas.

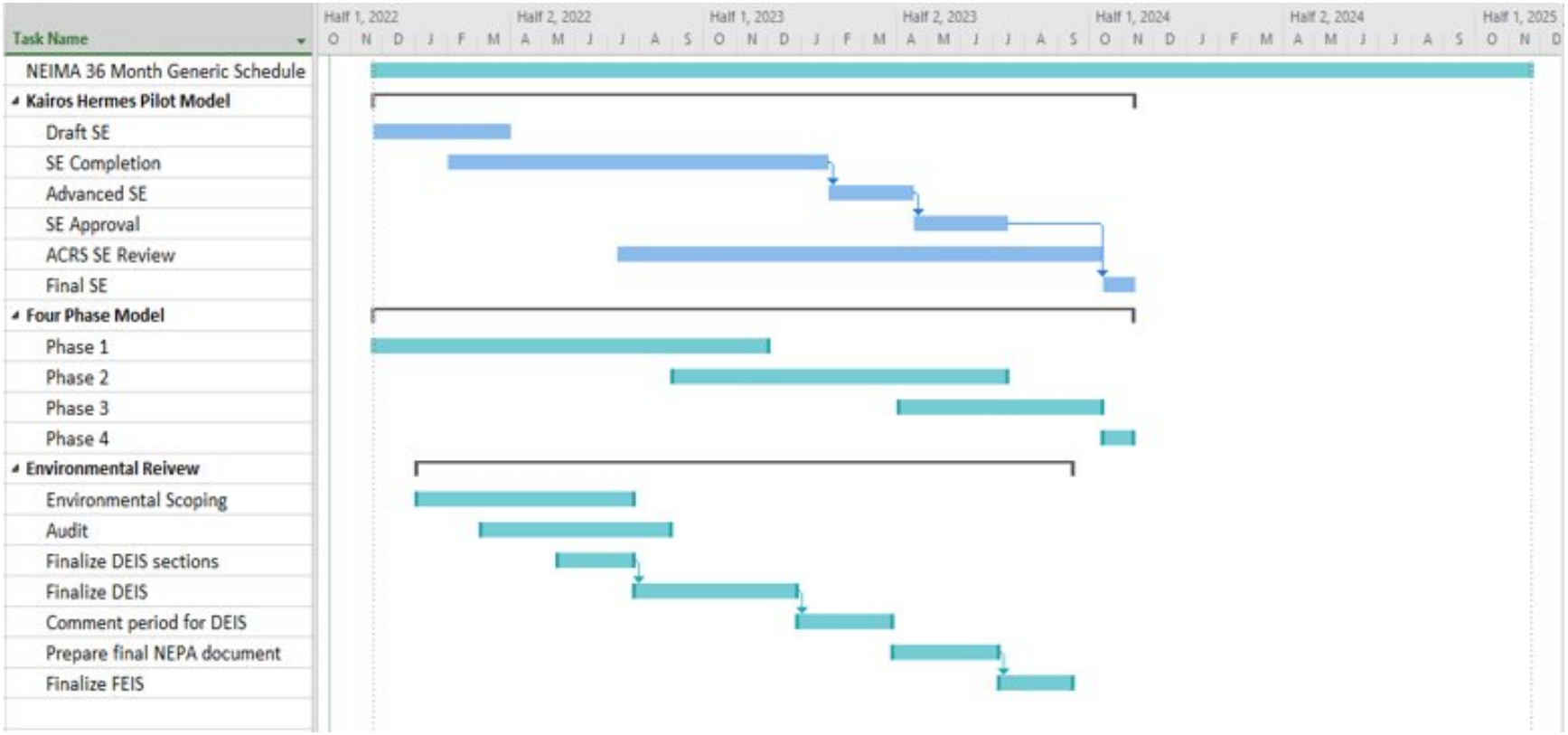
Comparison of Approaches

DANU proposal aligns with the 4 Phase Schedule because the SER with Open Items and ACRS Review of the SER with Open items are eliminated from the schedules. A comparison of this is shown in the table below:

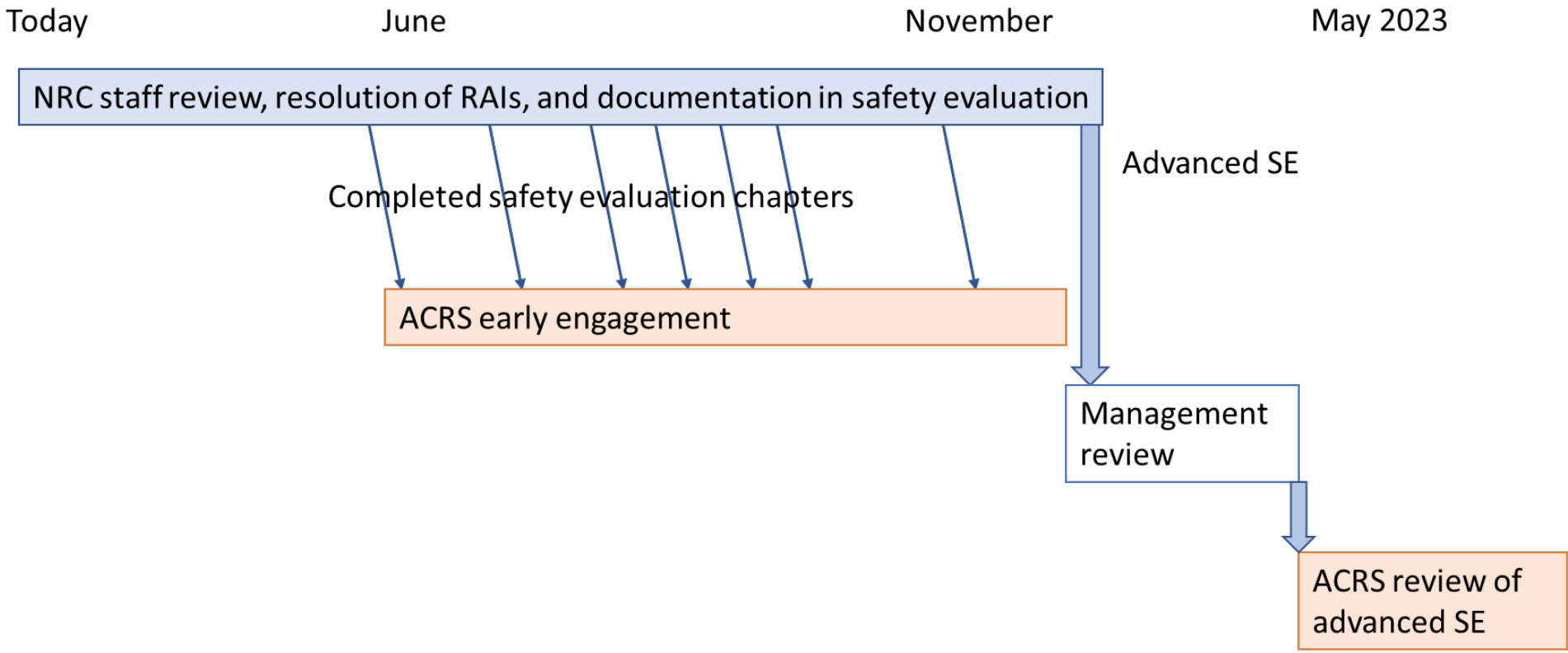
Kairos Pilot Model		**4 Phase Schedule**		**6 Phase Schedule**	
Milestone Group	Milestone Group Titles	Phase	Milestone Titles	Phase	Milestone Titles
1	Draft SER	A	Preliminary SER and RAIs Issued	1	Preliminary SER and RAIs Issued
2	SER Completion			2	SER with Open Items
3	Advanced SER	B	Advanced SER with no Open Items	3	ACRS Review of SER with Open Items
4	SER Approval			4	Advanced SER with no Open Items
5	ACRS SER Review	C	ACRS Meeting on Advanced SER	5	ACRS Review of Advanced SER with no Open Items
6	Final SER	D	Final SER Issued	6	Final SER with no Open Items Issued

Comparison of Approaches

COMPARISON OF REVIEW SCHEDULES



Engagement Envisioned for Hermes Review

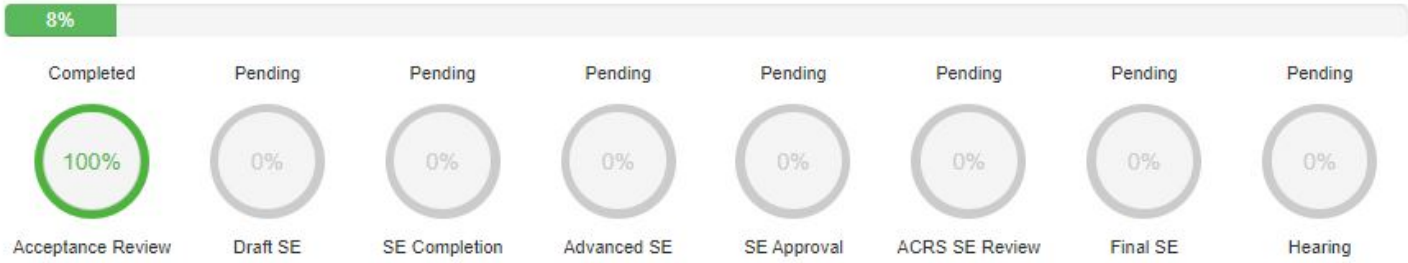


Hermes - Kairos Dashboard

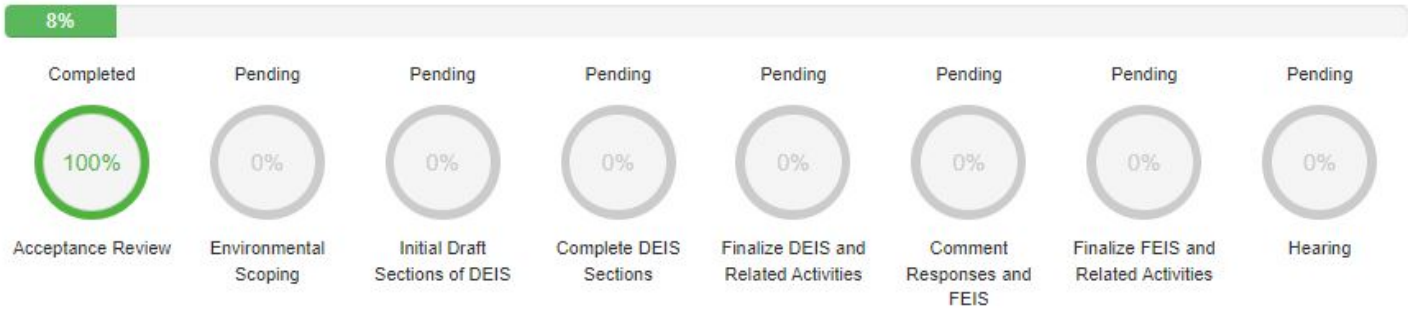
Overall Project Status

Schedule | Progress vs. Hours Spent | Technical Issue Resolution

Safety Review: Completion Status



Environmental Review: Completion Status



https://www.nrc.gov/reactors/non-power/hermes-kairos/dashboard.html

Key Messages

- Licensing of new and advanced reactors available under 10 CFR Parts 50, 52, and 53 (in development)
- Pre-application activities have been effective in preparing for application reviews
  - Pre-application engagement
  - Review and Assessment of White Papers
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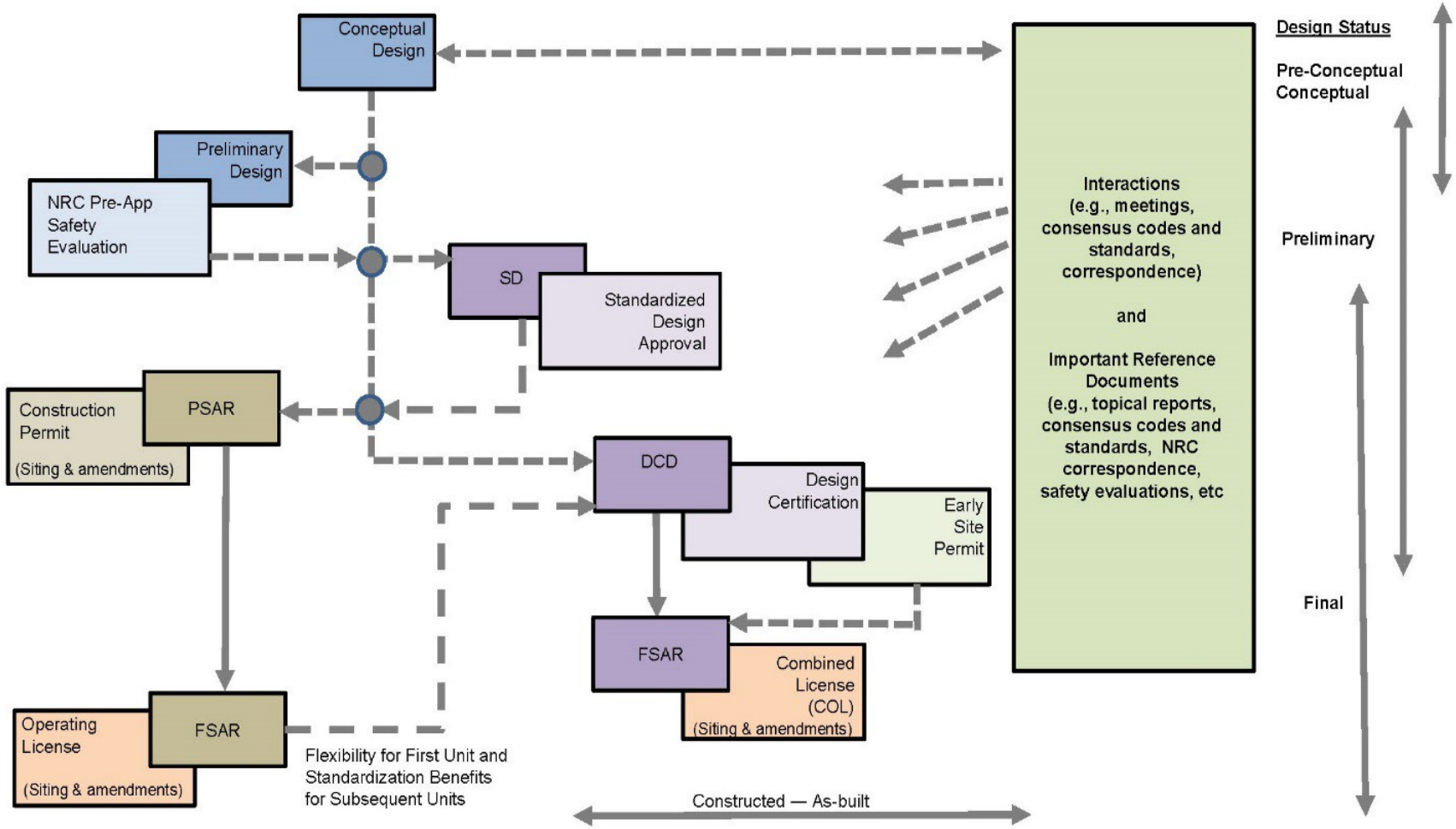
- Based on lessons learned, the NRC is enhancing its review processes with formal guidance and updates to its internal procedures

Questions & Answers

Backup Slides

NRC Related Licensing Processes



Draft Interim Staff Guidance for the Safety Review of Light-Water Power Reactor Construction Permit Applications

Carolyn Lauron
New Reactor Licensing Branch (NRLB)
Division of New and Renewed Licenses (DNRL)
Office of Nuclear Reactor Regulation (NRR)

What is the purpose of today's presentation?

To facilitate stakeholder understanding of the information contained in the construction permit interim staff guidance recently noticed in the *Federal Register* for comment. (86 FR 71101)

This presentation should aid in the development and submission of stakeholder written comments consistent with the instructions in the *Federal Register* notice.

Why was the interim staff guidance developed?

- NRC anticipates the submission of construction permit applications.
- NRC last reviewed and issued a light-water power-reactor construction permit in the 1970s.
- Recently, NRC reviewed and issued licenses using the one-step process in 10 CFR Part 52.
- There are ongoing NRC activities to realign the requirements in 10 CFR Parts 50 and 52, and to develop guidance for non-light-water reactor designs.

Availability of Draft ISG DNRL-ISG-2022-XX

On December 14, 2021, the NRC published a notice in the *Federal Register* requesting comments on the draft interim staff guidance by January 28, 2022. (86 FR 71101)

The draft interim staff guidance may be found in the NRC's Agencywide Documents Access and Management System at this link: ML21165A157

Scope of Draft ISG DNRL-ISG-2022-XX

The scope of the interim staff guidance is the safety review of light-water power-reactor construction permit applications.

The interim staff guidance supplements the existing review guidance for light-water power-reactor applications found in NUREG-0800.

Parts of Draft ISG DNRL-ISG-2022-XX

- Main Body of Document
  - Purpose, Background, Rationale, Applicability
  - Guidance
  - Implementation
  - Backfitting and Issue Finality Discussion, Congressional Review Act
  - Final Resolution
  - References
- Appendix

Guidance in Draft ISG DNRL-ISG-2022-XX

Guidance Subsections

- Requirements for a Power Reactor Construction Permit Application
- Light-Water-Reactor Safety Review Guidance
- Special Topics
  - Relationship between the Construction Permit and Operating License reviews
  - Purposes and benefits of preapplication activities
  - Lessons learned from recently issued construction permits
  - Approach for reviewing concurrent license applications and applications incorporating prior NRC approvals
  - Potential effect of ongoing regulatory activities on construction permit reviews and
  - Licensing requirements for byproduct, source, or special nuclear material.

Appendix to Draft ISG DNRL-ISG-2022-XX

- Supplements existing guidance in NUREG-0800
  - Reiterates the context, expected engagement, and review approach
  - Clarifies guidance for *selected safety-related topics*
- Not intended to include all topics expected and reviewed in a construction permit application.

Clarifications in Appendix to Draft ISG DNRL-ISG-2022-XX

Select topics discussed:

- Siting
- Radiological Consequence Analyses
- Transient and Accident Analyses
- Structures, Systems, and Components
- Protective Coatings Systems
- Instrumentation and Control
- Electrical System Design and
- Radioactive Waste Management

Submitting Comments on DNRL-ISG-2022-XX

Link to *Federal Register notice:* 86 FR 71101

Two ways to submit comments:

1. **Federal Rulemaking Website**: Go to https://www.regulations.gov/ and search for **Docket ID NRC-2021-0162**.
   - Address questions about Docket IDs in Regulations.gov to Stacy Schumann; telephone: 301-415-0624; email: Stacy.Schumann@nrc.gov
   - For technical questions, contact Carolyn Lauron, Office of Nuclear Reactor Regulation, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, telephone: 301-415-2736, email: Carolyn.Lauron@nrc.gov
2. **Mail comments** to: Office of Administration, Mail Stop: TWFN-7-A60M, U.S. Nuclear Regulatory Commission, Washington, DC 20555-0001, ATTN: Program Management, Announcements and Editing Staff.

Questions and Answers